AMSAT News Service Weekly Bulletins
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SB ALL @ AMSAT $ANS-209.01
DOVE WATCHDOG TIMER TIMES OUT

HR AMSAT NEWS SERVICE BULLETIN 209.01 FROM AMSAT HQ
SILVER SPRING, MD JULY 28, 1990
TO ALL RADIO AMATEURS BT

DOVE's Watchdog Timer Turns Off Two Meter Transmitter After Three Days

Last week the AMSAT News Service (ANS) reported that DOVE had come back to life sending its familiar AFSK ASCII packet telemetry on 145.825 MHz. For 3 days DOVE was heard all over the world until it became silent again on July 25th some time around 15:30 UTC. The speculation by Jim De Arras (WA4ONG) is that a pre-programmed software watchdog timer had expired and the DOVE on-board computer (OBC) had done what it was suppose to do: shut off the two meter transmitter. WA4ONG is DOVE's caretaker while N4HY and NK6K are out of the country attending the AMSAT-UK Colloquium at the University of Surrey July 27-30. The basic function of the watchdog timer is to tell DOVE's OBC "if you don't receive a valid command from the ground each day, then reset and give a safe-mode." Since N4HY got DOVE back on-line only hours before he was to leave for the University of Surrey in England, it appears there was some confusion as to what the proper command was that WA4ONG was suppose to send to update the watchdog timer daily. The default timer expiration was three days and it appears that DOVE did exactly what it was programmed to do, turn off the two meter transmitter after three days.

Because of the problem of the two meter transmitter transmitting while the DOVE's two meter receiver was listening for a ground command had been a major headaches last time, and it was necessary to use W5UN's gigantic EME station to get a reset command into DOVE's OBC, this watchdog was added by MICROSAT software engineers to prevent the two meter transmitter being on while the two meter receiver was looking for ground commands. DOVE listeners know that DOVE transmits for 2.5 minutes and then stops while its two meter receiver listens for 30 seconds. Basically, this timer tells DOVE that if "you don't hear a valid command from a ground station each day, then something is wrong. Go to a known state and wait patiently. But before you get there, turn off your two meter transmitter and be prepared to do an OBC reset command."

Next week both N4HY and NK6K will return from Surrey and the first order of business will be to go over all the diagnostic memory dumps to be sure it was indeed the watchdog that timed out. AMSAT-NA asks hams all over the world to please be patient once more as DOVE will surely return to two meters soon.

When DOVE resumes two meter transmissions, it is an indication that battery management is once again under OBC control and it is important to characterize battery behavior for several days thereafter. Amateurs worldwide are requested to collect DOVE telemetry and send it on diskette to the AMSAT-NA Telemetry Archive managed by Reid Bristor, WA4UPD, 4535 Deerwood Trail, Melbourne, Florida, 32935, U.S.A.
/EX
SB ALL @ AMSAT $ANS-209.02
WO-18 VIEWS TOTAL ECLIPSE

HR AMSAT NEWS SERVICE BULLETIN 209.02 FROM AMSAT HQ
SILVER SPRING, MD JULY 28, 1990
TO ALL RADIO AMATEURS BT

WEBERSAT passed through a total solar eclipse which occurred on 22 July 90

from 0152 to 0412 UTC at about 0243 UTC. Whole orbit type data and pictures were taken during the event in which it is thought that the satellite passed through both penumbra and umbra of the moon's shadow. These data are being transmitted in the WEBERSAT data stream for several days so that interested users will have ample opportunity to collect it.

WEBERSAT controllers are very pleased with the results; solar array currents measured during the eclipse period do indeed show measurable reductions at the expected times.

Further information on this particularly interesting WEBERSAT event will appear later in ANS and AMSAT publications.
/EX
SB ALL @ AMSAT $ANS-209.03
SP SAT ACTIVITY FM ZIMBABWE

HR AMSAT NEWS SERVICE BULLETIN 209.03 FROM AMSAT HQ
SILVER SPRING, MD JULY 28, 1990
TO ALL RADIO AMATEURS BT

Four Special Callsign Stations to be Heard on AO-10 and AO-13

OSCAR enthusiasts from Zimbabwe have organized a special satellite activity month celebrating "1990: THE YEAR OF THE AMATEUR SATELLITE". Z21HJ/R and Z21GH along with the active support of the Zimbabwe Amateur Radio Society are sponsoring four separate satellite stations operating from four different locations around Zimbabwe. These stations have been issued the call-signs: Z21SAT, Z22SAT, Z23SAT and Z24SAT (prefix hunters should find some interest in these calls). It is expected that the stations can be found on Mode B around the frequency of 145.905 MHz on AO-10 as well as on AO-13.

The stations will be activated over the weekends of 31 Aug through 30 Sept 1990. Special QSL cards will be available for each of the four stations. ANS has been informed that QSLs will be sent either via the bureau or if a speedier reply is desired, the standard DX-QSL protocol of including an IRC will hasten the card reciprocation.

In addition to the special QSL cards, those stations who have worked at least two of the four call signs will qualify for the "ZIMBABWE SATELLITE ACHIEVEMENT AWARD 1990". This beautiful award is based on African culture and shows the famous Victoria Falls in the background. The award will be available for a nominal donation. Further information on QSLing and the award should be available from the stations during the operation.
/EX
SB ALL @ AMSAT $ANS-209.04
YET ANOTHER AO13 ORBIT STUDY

HR AMSAT NEWS SERVICE BULLETIN 209.04 FROM AMSAT HQ
SILVER SPRING, MD JULY 28, 1990
TO ALL RADIO AMATEURS BT

Goddard Space Flight Center Experts Study AO-13's Perigee Decay

Tom Clark (W3IWI) and a fellow orbital dynamics expert, Erricos Pavlis of the the Goddard Space Flight Center in Greenbelt, MD have just concluded an in-depth and highly detailed study of AO-13's orbital decay situation. Both Tom and Erricos will present the results of their study in a paper to the AMSAT-NA Space Symposium later this year. While the purpose of this ANS bulletin is not to present the results of their combined efforts in great detail, some of the more outstanding points need to be mentioned to stop needless rumors.

Firstly, AO-13's perigee has been steadily decreasing at a rate of 785 meters/orbit. This was gleaned from studying orbital element sets from the

day after AO-13's apogee kick motor was fired almost two years ago. Using a simple procedure of linear extrapolation of the perigee altitude from orbital elements, one would be inclined to predict a orbital re-entry of AO-13 around early 1992. However, life is not that simple. Orbital mechanics is capable of throwing the unwary analyst a celestial curve-ball. Using an extremely sophisticated orbital ephemeris program which includes the effects of everything and the "kitchen sink," and running this program on a large mainframe computer, the results indicate that a simple linear extrapolation technique can not always produce accurate results when it comes to orbital decay. W3IWI's and Erricos's efforts from this huge program show that AO-13's perigee will continue to collapse from the present 1500 KM altitude now to a minimum of 600 KM by 1992. Throughout that year, AO-13's perigee will wander around from 580 to 650 KM. And then just when you thought it would continue to decay, AO-13's perigee will then start to rise again! It will rise to 800 KM by late 1993, and then start to decay again! After staying around 800 KM for awhile, AO-13's perigee will then start to decrease again and a predicted re-entry MIGHT occur around late 1996 or early 1997.

But in all of this, W3IWI asks that hams keep in mind that "the collective effects of gravity of the earth, sun, moon and planets on a highly elliptical satellite do not constitute a neat, simple predictive system -- it is in fact a classic chaotic system ...dependent on the initial conditions." The complete results of this detailed study will be presented in Houston, TX at the Johnson Space Flight Center (JSFC) on Oct. 20th when the JSFC ARC, W5RRR, will host the annual gathering of AMSAT's finest.
/EX
SB ALL @ AMSAT $ANS-209.05
RUDAK-2/RS-14 LAUNCH DELAYED

HR AMSAT NEWS SERVICE BULLETIN 209.05 FROM AMSAT HQ
SILVER SPRING, MD JULY 28, 1990
TO ALL RADIO AMATEURS BT

RUDAK-2/RS-14 Launch To Be Delayed Until Autumn

The AMSAT News Service (ANS) has received information from a reliable source that the launch of RUDAK-2/RS-14 has been delayed until Autumn. This delay is due to a hardware failure in the primary payload. The primary payload is a Soviet oceanographic research satellite known as GEOS and RUDAK-2 is riding "piggy-back." In addition to being a packet radio BBS, RUDAK-2 will also contain a Mode B linear transponder. The RUDAK-2 transponder was designed and built by AMSAT-DL and delivered to representatives of AMSAT-U-ORBITA in Munich on January 21, 1990. Accepting the RUDAK-2 transponder on behalf of the AMSAT-U-ORBITA was Leo Labutin (UA3CR) and Dr. Alexander Tenyakchev (UW3CZ).

Originally planned to be launched in June of 1990 on a PROTON rocket from the Pletetsk spaceport, RUDAK-2 is intended for a circular orbit with an altitude of 1000 KM and an orbital inclination of 98 degrees. AMSAT-NA will release further information concerning the launch date of RUDAK-2/RS-14 as soon as it is available.
/EX
SB ALL @ AMSAT $ANS-209.06
OPERATIONS NET SCHEDULE

HR AMSAT NEWS SERVICE BULLETIN 209.06 FROM AMSAT HQ
SILVER SPRING, MD JULY 28, 1990
TO ALL RADIO AMATEURS BT

AMSAT-NA Operations Net Schedule Announced

AMSAT Operations Nets are planned for the following times. Mode B nets are conducted on an AO-13 downlink frequency of 145.950. Mode J/L nets are con-

ducted on an AO-13 downlink frequency of 435.970.

Date UTC	Time	Phs	Mode	NCS	U.S. Day
07 Aug 90	0130	170	J/L	N5BF	Monday
18 Aug 90	0045	170	J/L	N5BF	Friday
28 Aug 90	0100	169	J/L	N5BF	Monday
08 Sep 90	0020	169	J/L	N5BF	Friday

Acting Operations Net Manager, Courtney Duncan, N5BF, is looking for assistance in running the net in the form of a permanent Net Manager and five or six additional net control stations. To volunteer, contact N5BF at: 4522 Ocean View Blvd, La Canada, CA 91011.

For information on the amateur satellite program and how you can participate, contact AMSAT-NA at P.O. Box 27, Washington, DC 20044, phone (301) 589-6062, or contact your local AMSAT Regional Area Coordinator listed below. Pick the Regional Area Coordinator that is closest to you and they can give you a list of other AMSAT Area Coordinators that may be closer to where you live.

Drew Deskur, KA1M, 19 Parker Dr, North Reading, MA 01864 (508) 664-0009
Harry Morton, WB2IBO, 261 N. Chestnut St. Massapequa, NY 11758 (516) 541-1783
David L Filmer, WB9QPG, Box 2077, West LaFayette, IN 47906 (317) 497-3007
Ron Curry, WA4GSS, 229 W. Green Hill Rd, Ashland, KY 41101 (606) 928-6672
Byron Lindsey, W4BIW, 1356 Vista Leaf Dr, Decatur, GA 30033 (404) 636-7452
Keith Pugh, W5IU, Box 121576, Fort Worth, TX 76121 (817) 292-5633
Jim McKim, W0CY, 1721 Glen Ave, Salina, KS 67401 (913) 827-2927
Gar Anderson, K0GA, 5820 Chowen Ave. S, Minneapolis, MN 55410 (612) 922-1160
Joe Holman, KA7LDN, 22909 N.E. 24th Place, Redmond, WA 98052 (206) 868-1040
David Cowdin, WD0HHU, 8325 S. Yukon St, Littleton, CO 80123 (303) 972-0648
Gene Davies, AA6NP, 3450 Ben Lomond Pl, Los Angeles, CA 90027 (213) 937-7942
Bob Gobrick, WA6ERB, 8825 Etcheverry Dr, Tracy, CA 95376 (209) 836-9160
/EX
SB ALL @ AMSAT $ANS-209.07
AO-13 TRANSPONDER SCHEDULE

HR AMSAT NEWS SERVICE BULLETIN 209.07 FROM AMSAT HQ
SILVER SPRING, MD JULY 28, 1990
TO ALL RADIO AMATEURS BT

A new Transponder Schedule for AO-13 was put into effect on July 3.

The present transponder schedule for AO-13 is as follows:

Mode-B	: MA 003 to MA 165
Mode-JL	: MA 165 to MA 190
Mode-LS	: MA 190 to MA 195 (Mode S Beacon only)
Mode-S	: MA 195 to MA 200
Mode-BS	: MA 200 to MA 205
Mode-B	: MA 205 to MA 240
Off	: MA 240 to MA 003
Omni Antennas	: MA 240 to MA 060

Cross mode B and S QSOs are possible from MA 200 to 205.

The current attitude estimate:

BLON = 207 and BLAT = +1

AMSAT-OSCAR-10 appears to be receiving sufficient solar panel illumination to support Mode-B transponder operations, therefore, the transponder is available for general use whenever AO-10 is in view at your location. Please DO NOT use the transponder if the signals are FMing. The current estimate of AO-10's attitude is LON 24 deg LAT -9 deg.

Much activity has been heard on AO-10 centering around a popular calling
frequency of 145.910 MHz.
/EX
SB ALL @ AMSAT $ORBS-209.O
Orbital Elements 209.OSCAR

HR AMSAT ORBITAL ELEMENTS FOR OSCAR SATELLITES
FROM N3FKV LORENA, TX JULY 28, 1990
TO ALL RADIO AMATEURS BT

Satellite: AO-10
Catalog number: 14129
Epoch time: 90202.22227088
Element set: 535
Inclination: 26.0271 deg
RA of node: 193.6152 deg
Eccentricity: 0.5957350
Arg of perigee: 161.1032 deg
Mean anomaly: 237.0789 deg
Mean motion: 2.05879966 rev/day
Decay rate: -1.00e-07 rev/day^2
Epoch rev: 5343

Satellite: UO-11
Catalog number: 14781
Epoch time: 90205.02567339
Element set: 762
Inclination: 97.9470 deg
RA of node: 256.3744 deg
Eccentricity: 0.0013301
Arg of perigee: 126.9258 deg
Mean anomaly: 233.3151 deg
Mean motion: 14.65505065 rev/day
Decay rate: 7.91e-06 rev/day^2
Epoch rev: 34136

Satellite: RS-10/11
Catalog number: 18129
Epoch time: 90205.86796798
Element set: 265
Inclination: 82.9291 deg
RA of node: 300.6886 deg
Eccentricity: 0.0012340
Arg of perigee: 21.8430 deg
Mean anomaly: 338.3251 deg
Mean motion: 13.72098597 rev/day
Decay rate: -1.12e-06 rev/day^2
Epoch rev: 15461

Satellite: AO-13
Catalog number: 19216
Epoch time: 90197.82067606
Element set: 139
Inclination: 57.0355 deg
RA of node: 145.3614 deg
Eccentricity: 0.6989638
Arg of perigee: 231.4991 deg
Mean anomaly: 42.6273 deg
Mean motion: 2.09702725 rev/day
Decay rate: -8.20e-07 rev/day^2
Epoch rev: 1602

Satellite: FO-20

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Catalog number: 20480
Epoch time:      90199.58691214
Element set:      94
Inclination:       99.0360 deg
RA of node:       240.1658 deg
Eccentricity:    0.0540852
Arg of perigee:   337.5079 deg
Mean anomaly:      20.3134 deg
Mean motion:   12.83157648 rev/day
Decay rate:       1.06e-06 rev/day^2
Epoch rev:            2077
/EX
SB ALL @ AMSAT $ORBS-209.D
Orbital Elements 209.MICROS

HR AMSAT ORBITAL ELEMENTS FOR THE MICROSATS
FROM N3FKV LORENA, TX      JULY 28, 1990
TO ALL RADIO AMATEURS BT

Satellite: UO-14
Catalog number: 20437
Epoch time:      90206.83601518
Element set:     187
Inclination:       98.6956 deg
RA of node:       282.8304 deg
Eccentricity:    0.0011814
Arg of perigee:    46.6066 deg
Mean anomaly:     313.6111 deg
Mean motion:   14.28662307 rev/day
Decay rate:       1.86e-06 rev/day^2
Epoch rev:            2638

Satellite: AO-16
Catalog number: 20439
Epoch time:      90207.10311923
Element set:      96
Inclination:       98.7020 deg
RA of node:       283.2202 deg
Eccentricity:    0.0012450
Arg of perigee:    46.3855 deg
Mean anomaly:     313.8335 deg
Mean motion:   14.28766803 rev/day
Decay rate:       1.98e-06 rev/day^2
Epoch rev:            2642

Satellite: DO-17
Catalog number: 20440
Epoch time:      90199.18477369
Element set:      98
Inclination:       98.7008 deg
RA of node:       275.3312 deg
Eccentricity:    0.0012650
Arg of perigee:    65.8478 deg
Mean anomaly:     294.4027 deg
Mean motion:   14.28810988 rev/day
Decay rate:       2.56e-06 rev/day^2
Epoch rev:            2529

Satellite: WO-18
Catalog number: 20441
Epoch time:      90207.08444772
Element set:     100
Inclination:       98.7018 deg
RA of node:       283.2375 deg
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Eccentricity:    0.0013067
Arg of perigee:    46.7923 deg
Mean anomaly:     313.4346 deg
Mean motion:   14.28908466 rev/day
Decay rate:       8.20e-07 rev/day^2
Epoch rev:            2642

Satellite: LO-19
Catalog number: 20442
Epoch time:      90207.07559340
Element set:      99
Inclination:       98.7023 deg
RA of node:       283.2494 deg
Eccentricity:    0.0013439
Arg of perigee:    46.6202 deg
Mean anomaly:     313.6104 deg
Mean motion:   14.28977533 rev/day
Decay rate:       8.40e-07 rev/day^2
Epoch rev:            2642
/EX
SB ALL @ AMSAT $ORBS-209.M
Orbital Elements 209.MISC

HR AMSAT ORBITAL ELEMENTS FOR MANNED AND MISCELLANEOUS SATELLITES
FROM N3FKV LORENA, TX      JULY 28, 1990
TO ALL RADIO AMATEURS BT

Satellite: SALYUT 7
Catalog number: 13138
Epoch time:      90206.42044929
Element set:     400
Inclination:       51.6003 deg
RA of node:       110.2086 deg
Eccentricity:    0.0001915
Arg of perigee:    88.9596 deg
Mean anomaly:     271.1709 deg
Mean motion:   15.66714211 rev/day
Decay rate:     2.9987e-04 rev/day^2
Epoch rev:           47084

Satellite: MIR
Catalog number: 16609
Epoch time:      90206.39972361
Element set:     817
Inclination:       51.6113 deg
RA of node:       137.7709 deg
Eccentricity:    0.0010092
Arg of perigee:   180.1747 deg
Mean anomaly:     179.9356 deg
Mean motion:   15.63331706 rev/day
Decay rate:     2.1369e-04 rev/day^2
Epoch rev:           25407

Satellite: HUBBLE
Catalog number: 20580
Epoch time:      90206.82447791
Element set:     148
Inclination:       28.4702 deg
RA of node:         3.7550 deg
Eccentricity:    0.0006020
Arg of perigee:   170.0638 deg
Mean anomaly:     190.0083 deg
Mean motion:   14.84624918 rev/day
Decay rate:      1.615e-05 rev/day^2
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Epoch rev:            1372

Satellite: BADR-1
Catalog number: 20685
Epoch time:      90204.50601142
Element set:      12
Inclination:       28.4963 deg
RA of node:       256.1649 deg
Eccentricity:    0.0551391
Arg of perigee:   205.7293 deg
Mean anomaly:     151.2654 deg
Mean motion:   14.92991381 rev/day
Decay rate:     1.8614e-03 rev/day^2
Epoch rev:             112
/EX
SB ALL @ AMSAT $ORBS-209.W
Orbital Elements 209.WEATHER

HR AMSAT ORBITAL ELEMENTS FOR WEATHER SATELLITES
FROM N3FKV LORENA, TX      JULY 28, 1990
TO ALL RADIO AMATEURS BT

Satellite: NOAA-9
Catalog number: 15427
Epoch time:      90205.09689309
Element set:     606
Inclination:       99.1694 deg
RA of node:       205.7859 deg
Eccentricity:    0.0014150
Arg of perigee:   265.2013 deg
Mean anomaly:      94.7540 deg
Mean motion:   14.12622879 rev/day
Decay rate:       2.76e-06 rev/day^2
Epoch rev:           28919

Satellite: NOAA-10
Catalog number: 16969
Epoch time:      90202.36241059
Element set:     453
Inclination:       98.5980 deg
RA of node:       229.5400 deg
Eccentricity:    0.0013460
Arg of perigee:   166.3681 deg
Mean anomaly:     193.7863 deg
Mean motion:   14.23667498 rev/day
Decay rate:       3.59e-06 rev/day^2
Epoch rev:           19947

Satellite: MET-2/16
Catalog number: 18312
Epoch time:      90206.07430102
Element set:     464
Inclination:       82.5532 deg
RA of node:       260.2650 deg
Eccentricity:    0.0012152
Arg of perigee:   139.4123 deg
Mean anomaly:     220.7942 deg
Mean motion:   13.83664529 rev/day
Decay rate:       2.19e-06 rev/day^2
Epoch rev:           14822

Satellite: MET-2/17
Catalog number: 18820
Epoch time:      90206.06963414
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Element set:     326
Inclination:       82.5468 deg
RA of node:        320.3439 deg
Eccentricity:    0.0015789
Arg of perigee:    214.2284 deg
Mean anomaly:      145.7861 deg
Mean motion:   13.84353860 rev/day
Decay rate:        5.30e-07 rev/day^2
Epoch rev:            12542

Satellite: MET-3/2
Catalog number: 19336
Epoch time:      90205.64662048
Element set:     537
Inclination:       82.5406 deg
RA of node:        250.9239 deg
Eccentricity:    0.0016359
Arg of perigee:    215.8167 deg
Mean anomaly:      144.1777 deg
Mean motion:   13.16897637 rev/day
Decay rate:        3.91e-06 rev/day^2
Epoch rev:            9588

Satellite: NOAA-11
Catalog number: 19531
Epoch time:      90206.22907459
Element set:     320
Inclination:       98.9841 deg
RA of node:        154.5844 deg
Eccentricity:    0.0011958
Arg of perigee:    172.3537 deg
Mean anomaly:      187.7816 deg
Mean motion:   14.11654798 rev/day
Decay rate:       -4.00e-08 rev/day^2
Epoch rev:            9433

Satellite: MET-2/18
Catalog number: 19851
Epoch time:      90206.05120754
Element set:     270
Inclination:       82.5189 deg
RA of node:        198.2854 deg
Eccentricity:    0.0012584
Arg of perigee:    256.2335 deg
Mean anomaly:      103.7416 deg
Mean motion:   13.83985874 rev/day
Decay rate:       -2.29e-06 rev/day^2
Epoch rev:            7080

Satellite: MET-3/3
Catalog number: 20305
Epoch time:      90206.99655905
Element set:     176
Inclination:       82.5503 deg
RA of node:        190.6244 deg
Eccentricity:    0.0014914
Arg of perigee:    228.9452 deg
Mean anomaly:      131.0383 deg
Mean motion:   13.15865271 rev/day
Decay rate:        3.90e-07 rev/day^2
Epoch rev:            3605

Satellite: MET-2/19
Catalog number: 20670
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Epoch time:      90207.12344511
Element set:      24
Inclination:       82.5439 deg
RA of node:       257.7623 deg
Eccentricity:    0.0016326
Arg of perigee:   173.8807 deg
Mean anomaly:     186.2552 deg
Mean motion:   13.83840577 rev/day
Decay rate:       8.80e-07 rev/day^2
Epoch rev:             390
/EX
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